

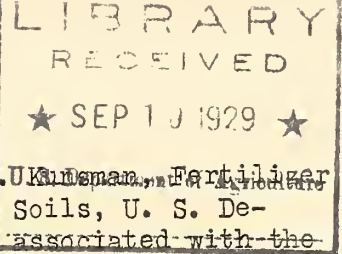
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SOURCES OF NITROGEN FOR FERTILIZERS



A radio talk by P. E. Howard, delivered by Dr. C. H. Kuhn, Fertilizer and Fixed Nitrogen Investigations, Bureau of Chemistry and Soils, U. S. Department of Agriculture, through WRC and 31 other stations associated with the National Broadcasting Company, 2 p.m., Tuesday, August 27th.

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Over every acre of the earth's surface are some thirty thousand tons of free nitrogen; this element makes up four-fifths of the air which we breathe.

Yet millions of acres of farm land are not producing as efficiently as they might because of lack of nitrogen. These acres produce scantily because the nitrogen in the air is not present in a form available for plant food.

Agriculture is interested -- it is plain to see -- in developing a process for fixing this atmospheric nitrogen into useful chemical compounds. The farms of America use two-thirds of all the nitrogen consumed in the United States. Industries also use great quantities -- explosive and chemical manufacturers, ice and refrigeration industries, and many others all need nitrogen.

Where do agriculture and industry get their nitrogen, if not from the huge supplies in the air? In the first place, our nitrogen has come in past years from Chilean nitrate of soda -- a substance which looks like common salt, contains 15-1/2 per cent nitrogen and comes from the rainless desert of western South America. The United States uses about one million tons of Chilean nitrate of soda each year. Then we get nitrogen from a chemical -- ammonium sulphate -- a by-product of our coke ovens. Ammonium sulphate supplies more than one-third of the total nitrogen consumed. Vegetable and animal waste such as cotton-seed meal and dried blood are important nitrogen materials, but they are available only in limited quantities.

Nature, too, helps out by providing bacteria which fix nitrogen in the soil or on the roots of legumes. Lightning discharges followed by downpours of rain also bring fixed nitrogen to the soil. But even though Nature does her best after we encourage her by planting legumes, the quantities of nitrogen fixed by natural means almost always fall short of the necessary amount.

So agriculture and industry have turned to the air. Not many years ago they enlisted the aid of science to find methods for transforming the free nitrogen of the air into useful products.

It is my pleasant duty to inform you today that this task has been accomplished. The art is steadily improving. Today there are one hundred nitrogen fixation plants in operation throughout the world. Several of them are in the United States.

You may be interested to know that this year, for the first time, nitrogen fixed within the United States is an important part of the total supply. It is predicted that the air nitrogen output of American plants for the current year will be three or four times as great as last year. You can judge of its size when I tell you that this year's production of atmospheric nitrogen will be the equivalent of six hundred thousand tons of Chilean nitrate of soda. That is three-fifths of the amount of nitrogen we have had to obtain annually from Chile.



But there is more to the story than just those figures. For the first time domestic air nitrogen production is going directly into fertilizer. Previously other markets were more attractive to the new industry. For many years all of us interested in nitrogen fixation have worked toward the common objective of an industry comparable to the needs of the country. Now it seems that the objective is within reach.

The Government has taken an active part in the work of establishing the industry in America. In our fixed nitrogen research laboratory, we have carried on and are continuing extended investigations to improve our knowledge of this extremely intricate business with the view of producing cheaper nitrogen compounds and therefore cheaper fertilizers.

More than ten years ago the Government built the Muscle Shoals nitrate plants for war purposes. No fertilizer has been produced there, although its use for the purpose has been widely advocated. Muscle Shoals perhaps still has peace-time possibilities. But, on account of various handicaps, my personal opinion is that it no longer appears to be a large factor in the fertilizer situation. In recent years several new and modern plants have been constructed. It is from these plants, belonging to private manufacturers, that we are getting our steadily increasing supply of fixed nitrogen from the air.

Now, to conclude, the chief fact that I want to leave with you is that the goal of a nitrogen fixing industry able to meet the needs of the United States is in sight.

